PSI 428
Attentional Processes

Attention and Memory

Learning Objectives

- Working memory capacity and endogenous vs. exogenous control of attention
- Article presentation

Working Attention

- Attentional processes filter information represented within the cognitive system as well
- Measures of WM capacity reflect both memory processes and executive attention

Working Attention

- Greater WM capacity does mean that more items can be maintained as active, but this is a result of greater ability to control attention, not a larger memory store.
- Greater WM capacity also means greater ability to use attention to avoid distraction.

Working Attention

- How do you integrate these ideas with alternative theories of attention
- Earcly vs. late selection
- Serial vs. parallel processing
- Attentional set
- Central bottleneck

Kane, M.J., Bleckley, M.K., Conway, A.R.A., & Engle, R.W. (2001). A controlled-attention view of WM capacity. Journal of Experimental Psychology: General, 130, 169–183.

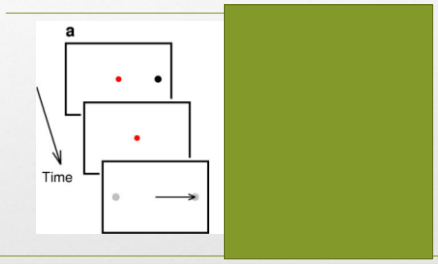
Kane et al., 2001

- WM capacity is related with the control of attention
- If true, WM capacity should predict performance with tasks unrelated with memory
- Pro-saccade and anti-saccade tasks

Pro-Saccade Task

- Participant is asked to fixate on an target
- A stimulus is then presented to one side of the target.
- The participant is asked to make a saccade toward the direction of the stimulus.

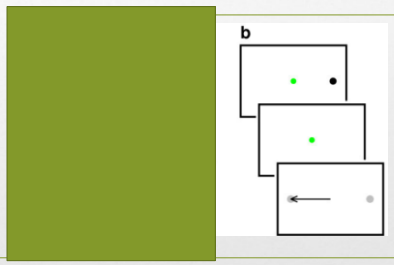
Pro-Saccade Task



Anti-Saccade Task

- Participant is asked to fixate on an target
- A stimulus is then presented to one side of the target.
- The participant is asked to make a saccade toward the opposite direction of the stimulus.

Pro-Saccade Task



Pro- and Anti-Saccade Task

- Pro- and anti-saccade task are related with endogenous or exogenous orienting of attention?

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Method

- Participants were screened for WM capacity using the operation-word span task (OSPAN)

IS (9/3) + 2 = 5 ? drill
IS (5 × 1) − 4 = 2 ? beach
IS (2 × 2) + 3 = 7 ? job

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Method

- Participants were grouped into two
- The mean OSPAN scores for high-span participants (N=100) were 23.65 (SD = 6.73, range = 18-55)
- The mean OSPAN scores for low-span participants (N=100) 6.07 (SD = 2.14, range = 0-9).

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Method

- Participants completed pro-saccade and anti-saccade blocks (18 trials each)
- Participants identified a letter appeared on the cued location.

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Results

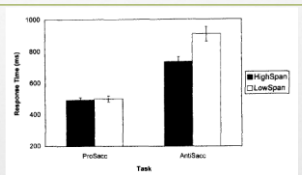

Figure 1. Mean target-identification latencies for high- and low-span participants for participants' first task only in Experiment 1, either prosaccade (ProSacc) or antisaccade (AntiSacc). Error bars depict standard errors of the means. ms = milliseconds.

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Results

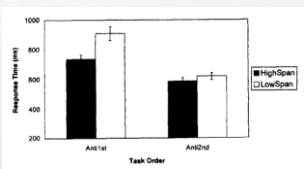

Figure 3. Mean target-identification latencies for high- and low-span participants in the antisaccade task, for those participants who performed the antisaccade task first (Anti1st) versus second (Anti2nd) in Experiment 1. Error bars depict standard errors of the means. ms = milliseconds.

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Results

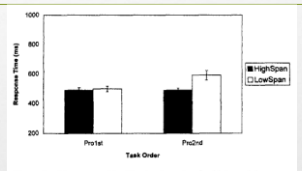

Figure 2. Mean target-identification latencies for high- and low-span participants in the prosaccade task, for those participants who performed the prosaccade task first (Pro1st) versus second (Pro2nd) in Experiment 1. Error bars depict standard errors of the means. ms = milliseconds.

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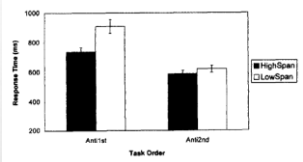

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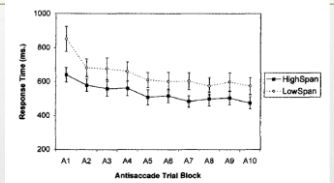

Figure 4. Mean target-identification latencies for high- and low-span participants across 10 antisaccade trial blocks (A1–A10) in Experiment 2. Error bars depict standard errors of the means. ms = milliseconds.

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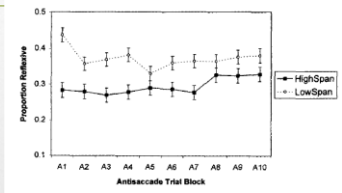

Figure 5. Mean proportion of reflexive eye movements, made in error, across 10 antisaccade trial blocks (A1–A10) for high- and low-span participants in Experiment 2. Error bars depict standard errors of the means.

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Results

- High-span participants demonstrated better control over visual orienting.
  - In anti-saccade trials reflexive orienting responses must be suppressed.
- High-span participants were less likely than low-span participants to move their eyes toward the flashing cue
- High-span participants were also faster and more accurate in identifying visual targets that appeared in the opposite location as the cue.

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Conclusion

- These findings are consistent with the idea that WM capacity, as defined by complex span measures, is a valid predictor of attentional control.